2016 Technology Master Plan
August 28, 2016

Colorado Mesa University
Grand Junction, Colorado
Executive Summary

The Colorado Mesa University Board of Trustees approved the 2020 Strategic Plan on January 29, 2016, adopting three institution-wide goals with associated objectives and metrics. Apparent throughout the strategic goals is the desire to grow the University through both the continued development of academic programs and the recruitment and retention of students and faculty. It was clear during the strategic planning process that institutional growth is even more important today than in prior years to sustain operating funds at a time when State financial support for institutions of higher education is diminishing, competition for students on a national level and online degree programs is increasing, and scrutiny of the price of education and its return on investment by families is mounting.

Today’s technology environment is being driven by at least three major trends related to student learning, reinforcing the importance of the University’s on-going investment in mobile and digital resources. First, students and employees have become accustomed to using their personal computing devices in educational and work settings to access online services from anywhere at any time, a trend frequently referred to as Bring Your Own Device. Providing online services to students and faculty with 24/7 availability requires reliable network and broadband connectivity, as well as a mobile-first approach to delivering applications and web services. A second technology trend is the adoption of cloud-based services. Cloud services have also become prevalent in the market place, making it easy for students and faculty to discover new applications and increasing their mobility. In addition to mobility, a third trend is the development of innovative learning environments that support the faculty’s instructional methods that promote student collaboration and enhance student-faculty interactions. Academic programs and faculty members are incorporating alternative instructional methods to the traditional classroom and are looking for technology support.

Meeting student technology expectations inside and outside of the classroom is essential to the success of the institution’s recruitment and retention of students. Under the State’s performance-based funding model, colleges and universities will be rewarded financially for students’ progress towards degree completion. Investing in technologies, that include customer relationship management applications and business analytics tools, will not only help the University engage with students by automating business processes and managing data, but the institution will also gain operational efficiencies and make more informed, data-driven decisions. These technologies can also provide insights into the recruitment and retention of faculty.

The University has entered an era where end-users have the ability to choose their computing experience, which can vary hourly by device and application. The pervasiveness of mobile computing – with new devices and operating systems continually entering the market – plus the widespread adoption of cloud-based services have increased the University’s information security risks. The University must stay committed to information security programs with an emphasis on endpoint management and end-user security awareness. Thus, technology will undoubtedly play an integral part
in achieving each of the University's 2020 strategic goals, although not all strategic plan objectives have direct technology metrics associated with them.

The purposes of the current Colorado Mesa University Technology Master Plan are to: 1) identify and align technology initiatives with the strategic goals of the University; 2) document the history of technology planning and accomplishments towards key technology goals; 3) demonstrate interdepartmental cooperation to successfully complete technology projects to meet institutional goals and the demands of a rapidly growing campus; and 4) provide insight into technology decisions and funding sources.

The 2016 Technology Master Plan establishes six major initiatives to support the University in meeting its strategic goals:

1) Improve business processes and institutional decision making through the use of technology;
2) Advance information security programs and business continuity planning;
3) Expand the digitization of content and services in support of the 21st century teacher/learner;
4) Improve access to online services regardless of physical locations and time of day
5) Efficiently manage university resources; and
6) Advance campus technology in support of institutional initiatives and campus expansion projects.

Information Technology staff members have identified goals that are outlined under each of the technology initiatives, with each goal aligned with a 2020 strategic institutional goal and the objective it supports. Finally, achievements toward each of the technology goals are documented.
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Introduction

The University updated its strategic plan in fall 2015, establishing institution-wide goals for 2020. Following Board approval of the 2020 Strategic Plan on January 29, 2016, it was important to revise the University’s Technology Master Plan so as to align it with the campus-wide document.

The purposes of the Colorado Mesa University Technology Master Plan are to: 1) identify and align technology initiatives with the 2020 strategic goals of the University; 2) document the history of technology planning and accomplishments towards key technology goals; 3) demonstrate interdepartmental cooperation to successfully complete technology projects to meet institutional goals and the demands of a rapidly growing campus; and 4) provide insight into technology decisions and funding sources.

A History of Technology Planning at Colorado Mesa

Colorado Mesa University’s first Technology Master Plan was completed January 19, 1999 and was submitted with the Facilities Master Plan, as found in Volume II, Appendix G. The history of technology development at Mesa State College from 1985 to 1999 is summarized in Appendix A of the 1999 Technology Master Plan.

The 1999 Technology Master Plan was amended in 2002 following the completion of the 2001 Academic Master Plan, and was submitted and reviewed concurrently as part of the Facilities Master Plan Amendment. Major technology accomplishments at this time were credited to the 1999 Technology Infrastructure Program Plan projects funded by the State. In addition, the 2002 Technology Master Plan Amendment provided information required by the Colorado Commission on Higher Education (CCHE) Policy as outlined in Section III: Capital Assets, Part D. Guidelines for Long Range Facilities/Infrastructure Master Planning, as revised April 5, 2001. The 2002 plan outlined specific projects and funding requests to meet those requirements.

The 2007-2008 Technology Master Plan aligned six major technology initiatives with the institution’s strategic goals as outlined in Achieving A Higher Degree: A Strategic Plan and Vision for Mesa State College. Technology goals and projects that support each initiative were established and documented. The format of the 2007-2008 Technology Master Plan was modified to document the wide range of technology projects that support the institution and their alignment to the institution’s strategic goals.

The 2012 Technology Master Plan was updated following a comprehensive review of the 2004 Strategic Plan in 2010. The 2010 Strategic Plan was approved by the then Mesa State College Board of Trustees on January 27, 2011. On August 10, 2011, Mesa State College officially became Colorado Mesa University. A number of technology goals were added with the 2012 Technology Master Plan, and two of its technology initiatives were broadened to emphasize the need to expand business continuity planning and improve support for today’s mobile learners.
Institutional Overview

The University’s Role and Mission

Colorado Mesa University (CMU) provides a broad, liberal arts core for its wide range of programs in the arts, sciences, humanities, and selected professional disciplines. CMU serves approximately 10,500 students annually and has four campuses in Western Colorado: Main, South, and Bishop campuses are located in Grand Junction, and the Montrose campus is located in Montrose Colorado, approximately 60 miles southeast of Grand Junction.

Colorado Mesa University, as part of its community college mission, has a two-year division located primarily on the Bishop Campus – Western Colorado Community College (WCCC) – which offers career and technical education programming. The University’s service region for delivering community college courses and programs is a subset of the 14-county area described below, while delivery of vocational courses is limited to Mesa County. Colorado Revised Statute (C.R.S.) 23-53-101 defines CMU’s four- and two-year role and mission.

Responsibilities as a Regional Education Provider

CMU’s service region, defined by the Department of Higher Education, encompasses a 14-county area in Western Colorado. This 14-county area – Mesa, Montrose, Delta, Ouray, San Miguel, Garfield, Pitkin, Eagle, Summit, Moffat, Rio Blanco, Routt, Jackson, and Grand counties – covers more than 28,000 square miles. Within this region there are numerous rural communities, which are isolated geographically by distance and terrain. CMU’s responsibilities as western Colorado’s regional education provider are defined statutorily in C.R.S. 23-1-127 (b):

“As regional education providers, Adams state university, Colorado Mesa University, and Western State College of Colorado shall have as their primary goal the assessment of regional education needs and, in consultation with the Colorado commission on higher education, the allocation of resources for the purposes of meeting those needs.”

The University delivers programs locally and regionally through a combination of site-based and distance delivery modes at a range of times and locations as part of its evolving role as a Regional Education Provider.

Partnerships have been formed with other community colleges in the region, as well as with Western Colorado Community College, not only for degree completion tracks but remote sites for the delivery of distance education courses.
State Performance Funding

State fiscal support for the University continues to decline. Additionally, the State adopted a new performance funding model for the FY 2015-16 budget as specified in HB 14-1319. With HB 14-1319, the State emphasized transparency in higher education funding and key outcomes (e.g., timely graduation rates) and reflected a strong desire to make the funding formula more understandable to Colorado taxpayers, students and families.

Institutional Strategic Planning Goals for 2020

In 2015, the University underwent a comprehensive review of its 2010 Strategic Plan. The University President convened a Strategic Planning Committee comprised of campus representatives, community members, and Trustees. Prior to the Strategic Planning Committee meeting, the University completed a Fast Forward 2.0 survey, and a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis during the spring and early summer of 2015. The SWOT analysis was the combined product of the internal accomplishments made by the institution towards the previous strategic goals, as published in the 2015 Progress Report on the Colorado Mesa University 2010 Strategic Planning Goals, with the external factors such as State and local economies that are outside of the University’s control, described in the Colorado Mesa University 2015 Strategic Planning External Opportunities and Threats document.

The Strategic Planning Committee began by reviewing these documents and met throughout the fall that included a series of focus group meetings with community/business leaders; WCCC/BOCES; Senior Management; Academic Department Heads; Administrative Staff; Students; Faculty; and Alumni.

The 2020 Strategic Plan was approved by the Colorado Mesa University Board of Trustees on January 29, 2016. The following strategic planning goals and objectives were established for 2020:

Goal 1. Become the university of choice for students, faculty and staff with a focus on academic excellence.

Objective 1A. Become the university of choice for students.
   Strategy 1. Attract and retain students with increasing levels of academic preparation.
   Strategy 2. Offer a rigorous student-centered educational environment that promotes academic success.

Objective 1B: Attract and retain faculty who balance a passion for teaching with a commitment to scholarship.

Objective 1C: Attract and retain staff who embrace the institution’s student-centered focus and are committed to student success.
Objective 1D: Advance learning opportunities that are innovative, integrated, experiential, and interdisciplinary.

Objective 1E: Increase recruitment and retention of faculty, staff, and students who reflect geographical, racial, ethnic, and age diversity.

Goal 2. Increase the level of educational attainment in the region through quality academic programming.

Objective 2A: Boost new student enrollment by an average of 2% per year.

Objective 2B: Increase the rates of first-year retention and six-year graduation for all students while reducing the attainment gap.

Objective 2C: Selectively add programs that enhance student opportunities after graduation.

Objective 2D: Increase community awareness of, and participation in, the life of our campus.

Objective 2E: Ensure that all graduates are prepared with the knowledge and skills required for the success in the 21st century workplace.

Goal 3. Continue the maturation of the university at all of its campuses.

Objective 3A: Continue commitment to small class sizes that promote high levels of faculty-student interaction.

Objective 3B: Nurture faculty members who embrace CMU’s teacher-scholar model.

Objective 3C: Continue to strengthen financial and Organizational structures that support the University’s strategic goals.
  - Strategy 2. Set Budget priorities in alignment with strategic planning goals.

Objective 3D: Enhance awareness among present and potential students of the educational opportunities available through CMU’s WCCC division and the Montrose campus.

In addition, metrics were aligned with each strategic goal/objective. Arguably, technology will play an integral part in accomplishing each strategic goal, although metrics under with Objective 1D are directly tied to Information Technology support and the advancement of technology infrastructure: expanded use of digital content and services.
(e.g., use of materials available from lecture capture; number of student e-Portfolios) and increased connectivity (e.g. amount of wireless infrastructure and bandwidth).

An Overview of Information Technology at Colorado Mesa University

Information Technology Mission

Information Technology serves Colorado Mesa University by strategically deploying technology, enabling the institution to achieve its goals and role as defined by the state as a regional education provider. With dedicated professional support staff, the Information Technology staff provides innovative teaching and learning environments, reliable and secure administrative systems, and access to electronic information to assist a diverse community of students and faculty.

Information Technology Department

The University’s technology resources are centrally managed and supported by the Information Technology (IT) department. The centralized management of IT systems and services is in part why the University continues to maintain lower operating budgets and is, in general, more conducive to securing information and streamlining technology implementations. Core IT systems and services are supported entirely by personnel located on the main campus, while computer support on satellite campuses is performed by onsite technicians and student assistants.

The Information Technology department is comprised of four units which work closely to meet the goals of the department and University. The Executive Director for Information and Communication Technology reports to the Vice President for Finance and Administration and is responsible for the daily operations of the department’s twenty-five full-time equivalent (FTE) employees who report to the director. Help Desk support services are integrated into the responsibilities of various members from each of the four units.

The four IT units by area of responsibility are:

- **Information Systems** (6 FTE) is responsible for the University’s administrative and student information system, Banner, which includes faculty/staff and student web based self-services, supports enterprise financial services (payroll, general accounting, accounts receivable, and accounts payable), budgeting services, human resource services, and student services (recruitment, registration, advising, and financial aid) as well other enterprise software including one card systems. This unit also assists with the evaluation of new software, and maintains interfaces between business applications and develops custom reports.

- **Computing and Network Systems** (6 FTE) manages a robust and secure data network and the core computing services for the University, including firewall, E-mail, data storage and backup, and server support. This unit works closely with
the Telecommunications and Instructional Technology unit to provide local area, wide area, and wireless network access for students, faculty, and staff. This entire unit actively participates in providing Help Desk support including all tier-2 and 3 support functions. The Director for Computing and Network Systems job responsibilities include managing security audits, vulnerability and threat assessments and direct responses to systems and network security events in addition to implementing information security policies and procedures and information security awareness programs.

- Computer Support Services (7 FTE) is responsible for installing and maintaining office, classroom and lab desktop computers and workstations; administering the University’s computer refresh program; software distribution; and maintaining software licensing records. The core of the Help Desk is comprised of staff from this work unit.

- Telecommunications and Instructional Technology (6 FTE) is responsible for the telephone system and telecommunication services, operator services, video conferencing, building structured cabling and infrastructure, and audiovisual (AV) support for classrooms and events.

The University contracts with Ellucian Application Managed Services (AMS) to provide Oracle and MS SQL Server database administration (DBA), plus software maintenance services for all licensed Ellucian software and the third party software platforms on which they run. The University outsourced its DBA work in fall 2015 after its longtime administrator retired. Ellucian Banner, CMU’s student information system, and other enterprise applications utilized across the institution are critical to the mission of the University.

**Information Technology Funding**

Information Technology is responsible for overseeing campus-wide technology budgets and projects, and through rigorous purchasing processes, has set campus standards for most hardware. IT operational funding is at an all-time high for the institution, although the staff funding level would still be considered lean by most campus standards. The University’s Technology Sustainability Plan is currently funded at $1.3M.

**Technology Trends**

In a time of increased regional and national competition for enrollments, potential students and their parents are becoming increasingly critical of the value of a post-secondary education. Value is not only based on cost per credit hour, but value in the quality of academic programs and administrative support services, including technology. In the case of some academic programs (e.g., engineering), students and parents evaluate their direct access to technology. If not directly, then students indirectly evaluate technology through their individual experiences while researching potential colleges and universities to attend.
Likewise, enrolled students evaluate technology through the use of major applications, such as course management systems to more basic online services such as recreational equipment checkout apps.

In sum, a great technology end-user experience is important to the growth of the University, not only for increased enrollments and student retention, but also for providing a quality education that meets student expectation with respect connectivity, mobility, innovative learning environments, and digital resources. Moreover, the advancement of technology platforms for administrative systems is paramount to providing reliable, secure services and increasing operational efficiencies. This section of the plan summarizes key technology trends that the University needs to monitor as it plans for the next three to five years.

**Bring Your Own Device**

The use of personal computing devices on university campuses and in the workplace, or Bring Your Own Device (BYOD), has become commonplace. Almost a decade after the modern smartphone with its touch-screen interface was introduced\(^1\), smartphones and tablets have almost saturated the marketspace of traditional-aged college students with 86% of U.S. adults between the ages of 18 and 29 owning a smartphone and 50% owning a tablet\(^2\). Although, the technology space of mobile computing is still in its beginning when compared to the lifetime of desktop computing and networking. Mobile devices and mobile computing will continue to advance for years to come. New classifications of mobile devices such as wearables and the Internet of Things will continue to become more prevalent and mobile and desktop applications will start to merge with universal apps.

Wireless local area network infrastructure must continue to expand to meet the demands of students bringing multiple computing devices, support data throughput rates required for streaming multimedia, and improve performance in high-density user areas inherent to university campuses. The theoretical data throughput rates for Wi-Fi have more than doubled since 2009 with the newest 802.11ac standards. These demands will require that the University continue its investments in wireless infrastructure as technology advances to meet student and faculty demands on the campus network. This includes replacing the institution’s wireless infrastructure on shorter replacement cycles to maintain indoor and outdoor Wi-Fi coverage and performance requirements, including enhancements to wireless roaming and device onboarding.

In addition to providing pervasive Wi-Fi connectivity for students and faculty, the University must provide web services optimized for mobile devices through the responsive website design websites or native apps. Companies globally are adopting mobile-first strategies and colleges and universities are no different. The University will need to continue to develop its mobile strategy to meet the demands of current and future students.

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\(^1\) Apple introduced the iPhone in January 2007.  
Cloud Services

Over the past decade the use of cloud-based services has become prevalent among household Internet subscribers which have extended into education and business applications. As described above, students and faculty will continue to use their own devices and expect the University's systems and services to work with the technology they bring to campus. The expectation for cloud applications is no different. Subscribing to cloud-based services allows the University to be more agile in the adoption of technology for academic programs and support services. Cloud services also have many benefits for the mobile learner as well as student and faculty collaboration, both inside and between institutions. Subscribing to cloud services also has its challenges in support, system integration, reliability of services and network connectivity.

Internet bandwidth requirements will continue to grow as cloud-based subscriptions increase, especially for multimedia focused applications. Over the past five years, Internet bandwidth serving the campus has increased by five times, and the University will need to continue to subscribe to more bandwidth and add diverse Internet services to provide reliable connectivity for educational purposes and residence hall students alike. In addition to reliability, the University must ensure Internet and wide area network performance, as more cloud-based services and managed hosted applications are leveraged for academic programs and administrative systems.

Innovative Learning Environments

In addition to adding infrastructure and enhancing web-content for optimal viewing on mobile devices to support BYOD trends, the University will need to provide innovative and advanced learning spaces that promote student collaboration and increase student-faculty interactions. Investments must continue in technologies and digital resources that enable faculty to develop innovative pedagogical approaches to make learning more personalized, engaging and active for students. Some examples of non-traditional learning models include: blended, flipped and experiential.

Likewise, investments in digital resources—software, web applications and content repositories—need to promote learning and not just facilitate the mechanics of the course work. Where feasible, the University should explore providing resources such as e-textbooks, adaptive learning applications, and digital assessment tools. The University also needs to continue investing in solutions that support interoperability standards, as well as maintain system integrations and identity and access management processes to promote ease of access to digital resources.

Customer Relationship Management and Business Analytics

Meeting student expectations with respect to technology inside and outside of the classroom is critical to the success of the institution. The long term success of the institution depends, in part, on growing student enrollments through recruitment and retention as well as making sound business decisions. In a time of declining State
financial support for institutions of higher education, the University needs to increase operational efficiency and generate new revenue streams. The institution must look towards technologies that businesses and other industries have leveraged for some time. The University would benefit from continuing to develop its customer relationship management (CRM) strategy for recruitment, retention, and alumni.

CRM technologies not only provide a highly personalized student interaction that they have come to expect, but increasing student degree completion rates help to address student and family return on investment concerns of a higher education. In addition, CRM technologies automate business processes to engage students, manage data, and provide a way to measure recruitment and retention efforts. Further, in order to increase operational efficiency and identify new revenue streams, the University must continue to make good decisions based on the University's data analyses. Investing resources towards technology solutions such as business analytics and data warehouse supports data-driven decision initiatives.

**Information Security**

Unquestionably, mobile devices and cloud-based services have changed the future of personal computing indefinitely. The widespread use of mobile devices, in combination with their storage capabilities, processing power and pervasive wireless connectivity has introduced additional privacy and security threats. Moreover, the volume of mobile devices to support, including an increasing number of types (e.g. wearables), and having a varied range of operating systems bring additional support and security challenges. The institution must advance its endpoint management structure to support desktops and mobile devices as maturing technologies such as wearables and universal applications mature.

Furthermore, in most cases, contracting with a cloud-based service provider requires the institution to store data outside of the University’s data center, adding exposure. Privacy and security risks are introduced with each application moved to the cloud. Protecting data stored offsite will be a continual challenge for the foreseeable future, placing increasingly more responsibility on end users and Information Technology professionals alike. In order to protect the institution’s data, the University must continue to evolve its information security program, dedicate resources to information security controls, and refine its review processes for cloud-based services.

**Technology Initiatives**

The Technology Master Plan identifies major technology initiatives, aligning them with the institution’s strategic goals, and summarizes key technology advancements towards those goals. The following list of technology initiatives and goals is not intended to be a complete list of IT projects completed, planned, or in process. Information Technology has identified six major technology initiatives that serve as the organizational structure for the following section on IT goals and accomplishments:
1) Improve business processes and institutional decision making through the use of technology;
2) Advance information security programs and business continuity planning;
3) Expand the digitization of content and services in support of the 21st century teacher/learner;
4) Improve access to online services regardless of physical locations and time of day;
5) Efficiently manage university resources; and
6) Advance campus technology in support of institutional initiatives and campus expansion projects.

**Information Technology Initiatives, Goals, and Accomplishments**

Note: A majority of the 2012 Technology Master Plan initiatives and goals have been modified or replaced to reflect the current institution-wide goals of the 2020 Strategic Plan and today’s technology trends. Where applicable, progress updates to the 2012 Technology Plan have been added to the end of each goal to either update or provide a closeout statement for the previous 2012 goal.

**Initiative 1: Improve business processes and institutional decision making through the use of technology.**

**Goal 1A:** Improve business analytics, reporting and practices to support management decision-making processes.

**Alignment:** Institutional Goal 3, Objective (O)3C-Strategy (S)1

**Status:** In-progress

**Accomplishments:** The institution continues to rely heavily on data to make key business decisions. Therefore, the University has identified a need to enhance data warehouse and business intelligence tools to simplify and accelerate daily reporting. Further, business units continually need to streamline information collection practices and improve accuracy. This will require changes in business practices as well as the applications that support those business units. For example, the institution has identified a need to merge data in Banner Student and Human Resources allowing the institution to better track the cost of courses and course delivery modes.

In 2015, a project proposal was developed for an institutional reporting and business analytics solution to: 1) assist in making data-driven business decisions; 2) enable end-user, self-service reporting and analysis; and 3) help address data security challenges. The project was developed around IBM’s Cognos Business Intelligence Reporting software and Ellucian’s Operation Data Store and
Enterprise Data Warehouse. The solution is designed to work together as a logical extension of the Banner ERP components. The Banner Operational Data Store converts complex data structures into common business terms that can be understood by any departmental user. Cognos will provide operational reporting and dashboards and enable real-time analysis. This self-service reporting tool will empower departments to make better use of their data and support institutional data-driven decision processes. The first phase of this multi-year project was funded at mid-year FY2015-16 and implementation began in spring 2016.

**Goal 1B:** Implement web-based administrative platforms to improve satisfaction with online support services.

**Alignment:** Institutional Goal 3, (O3C-S1)

**Status:** Ongoing

**Accomplishments:**
The University purchased a web portal, MAVzone, in 2006 to provide students, faculty and staff secure access to personalized information, targeted announcements, and online services based on Banner security roles. A main objective was to reduce the number of login screens and passwords for students and faculty. Ten years later, the institution needs to decide whether to continue with the maintenance of a web portal or move to another product without losing the personalized approach, visually eye-catching that appeals to today’s end users accessing administrative and academic support information. The direction selected should work to integrate with the Banner student information system; DegreeWorks degree planning and auditing software; and mobile platforms.

**2012 goal update:** This 2016 goal broadened the 2012 goal for implementing a campus web portal with a secure single sign-on access to services to address student access to all administrative and academic support services.

**Goal 1C:** Manage and automate student-centric processes through the development of Customer Relationship Management (CRM) technologies.

**Alignment:** Institutional Goal 1, (O1A-S1 & 2, O1E); Goal 2, (O2A, O2B); and Goal 3, (O3C-S1)

**Status:** In-progress

**Accomplishments:**
The University was using a proprietary Customer Relationship Management (CRM) platform for recruiting students for five years leading up to fall 2014. The product, while tailored to higher education, lagged behind with the integration of modern communication channels. Information Technology established a CRM strategy, not based on a single application, but centered on a common world-
recognized CRM platform, Microsoft Dynamics, that can be customized to provide
digital engagement applications with vendor supported integration to Banner.

In 2014, the University went live with Ellucian Recruiter as part of a CRM strategy
built on Microsoft Dynamics CRM. The project involved Admissions, Marketing
and Information Technology staff and offered a number of improvements over the
previous CRM application that included reporting, communication tools and a
connector with MS Outlook, as well as data integration components.

In 2015, CMU extended the use of its Microsoft Dynamic CRM strategy and
purchased Ellucian’s CRM Advise application to assist the University with
meeting its retention goals and funding under the State’s new performance-based
funding model. The CRM Advise software brings together academic and non-
academic information, combines these data points with historic predictors of
student success (e.g., socio-economic status and high school test scores, and
student affective traits), and then creates an integrated view that functions in near-
real-time.

CRM Advise is a digital engagement tool that will allow advisors, instructors, and
coaches to create alerts and provide feedback that can be used as part of
personalized engagement plans. The goal is to increase a student’s likelihood to
persist to degree completion through personalized reminders and high-touch
communication. The CRM Advise product is in the pilot implementation stage,
and the Office of Student Success went live in fall 2016. As part of the
implementation process, a custom academic advising form was created and several
custom data integrations were developed.

Goal 1D: Expand the use of Human Resource Management Systems.

Alignment: Institutional Goal 1, (O1B, O1C, O1E)

Status: Initiating

Accomplishments:
Human Resources staff members have identified a need to move to an online
applicant tracking solution that will improve its paper-based applicant tracking and
onboarding processes. In 2015, an RFP was developed for a solution capable of
providing a complete Recruiting Management/Application Tracking Solution with
a focus on the applicant experience that could grow and help the institution with
position management, employee onboarding, performance evaluations, and
reporting in the future. The vendor responses are presently under review. Moving
forward, the University plans to enhance its entire Human Resource Management
System to meet faculty and staff recruitment goals and to more extensively use
Banner HR modules and reduce manual data entry steps.
2012 goal update: The 2012 goal for implementing an electronic approval process for employee job assignments and more extensively using the Banner HR module was broadened with this 2016 goal to encompass all areas of Human Resource Management Systems.

Initiative 2: Advance information security programs and business continuity planning.

Goal 2A: Expand information security awareness programs.

Alignment: Institutional Goal 3, (O3C)

Status: Ongoing

Accomplishments:
An active information security awareness program is vital to the success of the University in securing information systems and student and institutional data. Information security programs start within the Information Technology Department as a priority and reach all University computer and network system users. Since the last Technology Master Plan, Information Technology’s team of directors and managers have reviewed and engaged in active discussion of SANS Top 20 Critical Security Controls in an effort to stay focused on current security practices and to implement pertinent elements of the critical security controls.

Information Technology is broadening the awareness of security practices to the end-user. In addition to required information security training for employees, an information security web page is maintained providing general security tips, links to newsletters and IT policies, and SANS Securing the Human videos; cybersecurity posters and media on digital signs are displayed; and security reminders are sent out via email to relay general information and to address current threats.

Recently, Information Technology began holding lunch and learn security sessions for staff and faculty. In these sessions, staff and faculty discuss information security topics that should be understood, at least at a base level, by everyone with IT security professionals after watching a short video from the Securing the Human information security awareness platform.

Another notable change in the last four years is the outreach to students to make them aware of cybersecurity threats. The campus information security program was expanded with student during the 2014-15 academic year to help protect students and make them aware of potential information security threats that exists online that can lead to identity theft or financial loss. In the past, the IT department has utilized email, MAVzone announcements, and digital signage to describe potential information security threats that exist online. This past year,
Information Technology staff tried a more visible method to bring the importance of information security to the forefront by distributing small fun items with information security tips printed on them. Information security topics were also introduced in the Freshman Year Initiative technology sessions.

2012 goal update: The 2012 goal for instituting an information security awareness training program and stronger password requirements for end users was retained because information security programs are such a critical component of protecting institutional data and student privacy. A stronger password policy was addressed in the 2012 plan and therefore has been removed. Future modifications to security controls will be documented in the below 2016 goal pertaining to Information Technology policies and security practices.

Goal 2B: Update Information Technology policies and security practices with a focus on addressing risks associated with mobile devices and cloud services.

Alignment: Institutional Goal 3, (O3C)

Status: Initiating

Accomplishments:
An enormous amount of work has focused on updating information security practices over the past four years. Enhancements have included upgrades to the campus firewall, how a student’s initial password is communicated with the end user, annual penetration and vulnerability assessments, and further segmenting the campus local area network. CMU has contracted with an outside vendor to perform external network penetration test and vulnerability assessment for the last three consecutive years. The final report for each external assessment has been overall positive with improvement made from year to year to help harden the University’s computing environment.

In addition to the above mentioned security improvements, considerable time and resources have been directed to meeting new Payment Card Industry Digital Security Standard (PCI-DSS) 3.0 compliance requirements for June of 2015.

To achieve compliance with PCI-DSS 3.0 standards, the following tasks were preformed:

- all required NuVision Point of Sale (POS) systems were upgraded;
- the campus PCI network was restructured and expanded;
- a properly logged PCI training procedure using “The Guard” system was implemented;
- a mandatory PCI training for required individuals was developed;
- a File Integrity Management (FIM) system in the PCI network was implemented;
- an additional Nessus server within the PCI network to perform internal vulnerability tests on a quarterly basis was implemented;
• two-factor authentication protocols for vendors supporting systems on the PCI network were initiated; and
• contracts for additional PCI specific external penetration testing and vulnerability assessments were expanded.

Implementation of a File Integrity Management system took substantial effort due to the complexity of the implementation. File Integrity Management system monitors the characteristics of critical files on systems on the network. If a file is modified or access rights to the file are changed, an alert is sent to the administrator of the system so they can determine if a compromise has occurred.

Further, significant research was performed to provide input with respect to electronic medical record systems and associated security requirements pertaining to Health Insurance Portability and Accountability Act (HIPAA) for the University’s medical billing related RFPs.

2012 goal update: This 2016 goal encapsulates three 2012 information security goals for implementing a laptop encryption policy and establishing policies regarding storing private information on mobile storage devices, strengthening the University’s perimeter network by identifying additional staff resources dedicated to network security and installing security appliances, and enhancing the security of the institution’s wireless network. All three previous goals are still pertinent to today’s computing environment, but major advancements in each area have been documented in the past and new updates will be incorporated within this revised goal.

Goal 2C: Expand disaster recovery planning preparations and testing.

Alignment: Institutional Goal 3, (O3C)

Status: Ongoing

Accomplishments:
It is extremely important for the University to maintain business operations during events ranging from an unplanned system failure to a natural or man-made disaster. In 2013, the Information Technology Business Continuity and Disaster Recovery Plan was completely revamped. The current plan is significantly different from previous versions in that it is more strategic in nature and less of a collection of system restore procedures. The plan identifies information system recovery and data backup strategies that are to be used to reduce recovery times and mitigate the risk of data loss.

The concept of using Information System Contingency Plans for identified high-impact IT systems was introduced to establish procedures for the assessment and recovery of systems following a disaster. Information System Contingency Plans
will continue to be fully developed. The maintenance of these plans is the responsibility of area managers.

Starting in 2013, System Impact Assessment and Business Continuity Questionnaires were sent out to department managers with responsibility or oversight over computer systems containing sensitive information. The information collected in the questionnaires is being used in the development of operational plans and reference material that will enable the Information Technology department to respond appropriately to significant events negatively affecting the information systems utilized on a daily basis by the University. This interview process and documentation will also enable the Information Technology department to potentially learn of new systems that are not currently logged, but may contain sensitive information. Since the start of this process ten departments have completed a System Impact Assessment and Business Continuity Questionnaire and have undergone IT review. Another six departments have started the questionnaire process. This project is ongoing and will be repeated on a periodic basis.

A key strategy in CMU’s IT Business Continuity and Disaster Recovery Plan is to have an active alternate, hot-site to back up the main data center. The current site is small, with limited equipment to increase site availability and subsequently system uptimes. The University is planning for new secondary server room as its alternate site in the Health Sciences Center Project. The new secondary server room will help provide the necessary protection from large campus disaster by further separating redundant server and storage systems from the primary data center. The secondary server room layout was configured to house all necessary network and server equipment that will eventually support the north side of campus as well all redundant systems. The construction includes new underground IT infrastructure to accommodate a secondary Internet service provider for campus. Moving the University’s redundant servers and storage systems will occur after all construction in the general area is complete.

Also included in the IT Business Continuity and Disaster Recovery Plan is a complete backup strategy to safeguard institutional data against inadvertent loss in the event of unexpected equipment failure, application error, or human error. In January 2015, CMU moved to a full disk-to-disk-to-disk backup solution as part of its comprehensive backup strategy, eliminating the need for tape backup appliances. The institution’s data is backed up to disk and then replicated to third disk storage array at an off-site location in order to improve the odds of recovering data and systems following a large campus disaster.

2012 goal update: The 2012 goal for improving disaster recovery planning and data protection services was retained and slightly modified for this 2016 goal.
**Goal 2D:** Improve the process for which the University identifies, assesses, and manages the risks associated with IT systems and projects.

**Alignment:** Institutional Goal 3, (O3C)

**Status:** In-progress

**Accomplishments:**
Information Technology has identified the need to develop a formal and effective risk management program to mitigate the risks identified with IT projects. The risk management program should incorporate a process to perform risk assessments prior to technology purchases.

The development of a project scoping document is underway that will include data security questions.

**Initiative 3: Expand the digitization of content and services in support of the 21st century teacher/learner.**

**Goal 3A:** Support the growth of distance education and online programs.

**Alignment:** Institutional Goal 1, (O1D)

**Status:** Ongoing

**Accomplishments:**
Colorado Mesa continues to grow its online degree programs and course delivery options to satellite campuses. Information Technology is currently working with staff members in Distance Education to expand the use of its learning management systems and integration with identity management process and third-party application to enhance blended and online courses.

**Goal 3B:** Support the adoption of digital media in lectures and course materials and provide up-to-date digital media platforms.

**Alignment:** Institutional Goal 1, (O1D), Goal 2 (O2E)

**Status:** In-progress

**Accomplishments:**
The University’s investment in digital resources is crucial to the support of its traditional classroom environments and its development of non-traditional approaches to instruction. Additional support for digital resources – or software, web applications, and media repositories – will be required for all academic programs as the institution matures. Many academic programs already use
technology to enhance experiential learning, and instructors continue to work on instructional approaches such as blended courses and flipped classrooms. The University must continue to provide digital learning environments that promote student collaboration and student-faculty interactions and invest in resources such as e-textbooks, adaptive learning applications, and digital assessment tools.

Over the past year, the University has invested in two technology solutions that assist faculty and students with the creation and consumption of digital media. First, the University has adopted a lecture capture and video content management platform for recording, storing and viewing instructor lectures and student presentations. The lecture capture platform provides a digital repository for storing multimedia with an online editing tool.

The second technology solution, an ePortfolio and Assessment Management application, was purchased to support the University’s implementation of an Integrative Learning curriculum model and its Essential Learning courses, including Maverick Milestone capstone courses being developed by faculty. The ePortfolio solution was selected to advance the University’s work on assessment and student learning outcomes. It also provides a students and faculty a place to upload, design and maintain an electronic portfolio of their academic and professional work.

Goal 3C: Provide technical training and support campus digital literacy programs.

Alignment: Institutional Goal 1, (O1D)

Status: Ongoing

Accomplishments:
The pervasiveness of technology on a university campus and the extensive use of online services require a higher level of technical knowledge among users. The digital literacy of end users – or the ability to use varies technology tools readily available and the necessary knowledge to effectively apply technology as a learning tool in an educational environment – needs to improve through professional development and technical training. Information Technology staff must continue to be a resource for technical training in support of campus digital literacy programs.
Initiative 4: Improve access to online services regardless of physical locations and time of day.

**Goal 4A:** Increase Internet bandwidth.

**Alignment:** Institutional Goal 1, (O1D)

**Status:** Ongoing

**Accomplishments:**
Colorado Mesa University has steadily increased its Internet service and Wide Area Network (WAN) bandwidth between campuses over the past four years. Since the plan was last updated, CMU subscribes to more than six times the Internet bandwidth that was available to users in the fall of 2012. As student and instructional needs for bandwidth grows, the University will continue to increase Internet and Wide Area Network bandwidth.

In addition to Internet bandwidth growth, wide area network connections to the main campus have increased, where required, and redundant links and secondary Internet providers have been added to strengthen the reliability of these services. More details on network growth are found under the accomplishments of Goal 4B.

**Goal 4B:** Expand campus wireless infrastructure and increase support for Bring Your Own Device (BYOD) trends.

**Alignment:** Institutional Goal 1, (O1D)

**Status:** Ongoing

**Accomplishments:**
The University has expanded its Wireless Local Area Network (WLAN) by increasing the number of wireless access points that service its campuses. CMU has approximately 850 access points; blanketing residence halls and academic spaces by increasing the number access points by more than fifty percent from the number deployed in 2012. The largest number of access points per square footage was added in 2015, with the renovation of Tomlinson Library, where seventy-five wireless access points were added to support the new information commons. In addition to adding access points, a Wi-Fi analyzer and wireless planning software were purchased to perform coverage surveys, resulting in re-orienting and/or re-positioning access points to improve wireless coverage and performance in trouble coverage areas.

In 2014, Information Technology researched outdoor Wi-Fi solutions to improve wireless connectivity for students in outdoors and between buildings. An analysis of 802.11n versus 802.11ac wireless technologies was evaluated, with 802.11ac access points being deployed for the first time in Garfield Hall. This was put in
place primarily to provide students access to network resources and the Internet at greater distances from the building. The University is currently studying the best way to service outdoor Wi-Fi access for common areas.

Over the 2015-16 academic year, the University’s assessed its current wireless infrastructure vendor and compared alternate solutions. Information Technology staff determined that migrating to Aruba wireless access points, controllers and management software would benefit students and employees. Benefits of Aruba include performance, ease of management, and reduced support costs. In order to determine which overall solution would be the best fit for CMU, a pilot of Aruba wireless equipment was deployed in Lowell Heiny Hall, and a trial of Aruba’s AirWave management software was conducted. To migrate the entire campus wireless infrastructure will take two to three years. The goal is to reduce annual operating costs and improve reliability and performance for end users.

2012 goal update: The 2012 goal for expanding the campus Wireless Local Area Network (WLAN) for student Internet access was retained, but it was broadened for the 2016 goal to emphasize the need to enhance wireless coverage and to better support BYOD devices used by students and faculty.

Goal 4C: Adopt technology solutions where mobility is the ultimate benchmark for the completeness of the solution.

Alignment: Institutional Goal 1, (O1D)

Status: Ongoing

Accomplishments:
CMU Mobile app was launched in the spring 2015 semester. After three months, it had been downloaded 3,570 times and installed on 1,300 Android and 2,270 Apple iOS devices. As of July 15, 2016, CMU Mobile has been downloaded and installed 5,780 times, again with the majority of installs on Apple iOS devices. The app provides a way for students to view their schedules, grades, and holds; access Desire2Learn; and make payments on their student account. It also includes RSS news and athletics news feeds, a GPS map of the University’s buildings and a faculty and staff directory. The app is integrated with the R25 room scheduling software to provide an events calendar.

Additionally, a Touchnet Mobile site was implemented to provide students with an easier way to view their account and make payments from mobile devices. To enable access to Touchnet e-Pay from CMU Mobile, Central Authentication Service (CAS) single sign-on method was implemented for Touchnet. Touchnet payment connectors for Recruiter online application, AIMs parking system, and University Tickets were also installed.
To further support the mobility of students, student accounts were migrated in February 2014 to Microsoft’s Office 365 cloud-based services for email with Exchange ActiveSync for mobile devices, online storage with file synchronization and versioning, shared workspaces, and web conferencing. In addition, with CMU’s Office 365 subscription, each student is qualified to download Office 365 Professional Plus and install the Office suite on up to five computers or mobile devices. Moving students to Microsoft’s cloud-based offering has provided students better interoperability between mobile devices and campus communication systems and an improved set of collaboration and file sharing tools.

With input from the Academic Technology Advisory Council, a wireless presentation device standard has been adopted for new classroom installations. The device has a mobile app that allows students and faculty the ability to share content wirelessly from the most prominent mobile devices carried by students, including Apple iOS, Android and Windows Mobile devices.

**Goal 4D:** Explore the use of tablets as a viable desktop replacement for employees where mobility is critical to the success of their position.

**Alignment:** Institutional Goal 1, (O1D)

**Status:** Initiating

**Accomplishments:**
Increasingly, faculty and staff are requesting that the University provide multiple computing devices to meet office requirements and support mobility requests. Faculty members are requesting a tablet in addition to their office computer for use while traveling or to enhance classroom instruction. As tablets become more powerful, the University may consider replacing standard desktops and/or laptops with the latest tablet computer that would meet both office and mobility requirements within current technology funding.

This approach has some challenges. First, the cost of tablet computers and associated peripherals, such as monitors and docking stations, are still considerably more expensive to purchase than a standard desktop and have additional support challenges. Second, tablet computers are still not capable of running all desktop software necessary for academic instruction. Utilizing desktop virtualization technology may provide an option for running required curriculum software but at an increased operational cost. Information Technology must continue to track advancements in tablet computers to determine when the purchase of these devices will become a viable option for desktop replacements with their advantages in mobility.
**Goal 4E:** Increase the availability and performance of computer applications and systems.

**Alignment:** Institutional Goal 3, (O3C)

**Status:** Ongoing

**Accomplishments:**
Colorado Mesa University has been leveraging server virtualization technology for more than a decade to increase the availability of applications and services as the University works toward 24/7 uptime of computer systems. Server virtualization provides functionality, such as live migration of running services between hosts, with no user interruption to eliminate application downtime for planned server maintenance. It also automatically restarts virtual machines within minutes on a redundant host in the event of a hardware or operating system failure. In addition to increasing the availability of applications, other benefits of server virtualization include: increased agility for faster delivery of campus projects; decreased capital and operating costs; reduced system management time; and improved disaster recovery planning.

Other strategies that CMU uses to improve system availability of computer application and systems is through the purchase of equipment with component redundancy built in, the use of cloud-based services, and the setup of alternate sites, or hot sites, on campus that are separate from the main data center and designated for emergency use to provide data processing services when the primary location is inaccessible. The latter is accomplished by furnishing the alternate site with servers, network equipment and connectivity to fail over mission-critical systems and data mirroring technology. The University is looking to enhance its alternate site strategy by upgrading its facility to what was the hospital server room, currently being renovated with the Health Science Center Project.

Further, the University has established service level agreements with providers and has a redundant Internet link to improve network uptime. This strategy is currently being expanded with the evaluation of adding a secondary Internet provider to improve network fault tolerance. In order to allow for automatic failover between two Internet providers, border gateway protocol routing will be deployed and traffic load balancing methods will be implemented.
Initiative 5: Efficiently manage university resources.

Goal 5A: Increase faculty involvement in campus technology decisions.

Alignment: Institutional Goal 1, (O1D)

Status: Ongoing

Accomplishments:
The University established the Academic Technology Advisory Council (ATAC) in 2009 to increase faculty involvement in technology decisions. ATAC is comprised of representatives from each Academic Department, Extended Studies, Library, and Information Technology. The Council has been involved in technology decisions ranging from the development of a digital high-definition classroom standard to ways to improve faculty communication of classroom and lab issues with support staff.

Some of the most notable technology areas discussed in the past four years, in addition to instructional technology for classrooms, included: wireless presentation systems, lecture capture, e-portfolios, MAVprint and wireless student printing, Office 365 and collaboration software, and SharePoint content sharing. One example of how campus decisions benefited from increased faculty involvement was in the yearlong, in-depth discussion on lecture capture technologies. Topics surrounding lecture capture revolved around:

- key capabilities that would be required for a campus solution to be adopted;
- support requirements;
- how long content would be stored;
- how the use of the technology might affect in-class dynamics;
- controlling access to course content;
- copyright; and
- intellectual property of the captured material.

The project culminated in the Academic Technology Advisory Council and faculty members across the institution participating in the development of an RFP and vendor review process for an institutional-wide lecture capture and video content management solution.

Goal 5B: Develop a process to prioritize technology projects to best meet the institution’s strategic initiatives with available campus resources.

Alignment: Institutional Goal 3, (O3C-S2)

Status: Initiating

Accomplishments:
Today there are myriad technological solutions to enhance instruction and improve the efficiency of business units. The University’s limited resources, accentuated
by an ever-increasing demand on staff time that is coupled with endless project possibilities, leads to the conclusion that CMU would benefit from a formal process to prioritize technology projects and align them with institutional goals. The process should assist with evaluating technology solutions, scheduling projects and allocating of campus resources. The process should also analyze areas where the University can leverage campus-wide solutions and take advantage of economies of scale.

**Goal 5C:** Expand technology sustainability planning inventories and practices.

**Alignment:** Institutional Goal 3, (O3C)

**Status:** Ongoing

**Accomplishments:**
CMU has developed a comprehensive Technology Sustainability Plan that includes a collection of procedures and equipment inventories used to budget for, analyze, coordinate, and report equipment replacement initiatives. The goal of the Sustainability Plan is to keep the institution moving forward by advancing technology, not just replacing old equipment. This results in the University not replacing hardware and obsolete systems, but rather investing in new technologies to meet the University’s mission.

The Sustainability Plan is an integral part of budgeting for technology and managing purchases, as well as an effective tool for coordinating hardware replacements. It provides replacement schedules for computers, servers and storage systems, network equipment, instructional technology, communication systems, and disaster recovery systems.

The Technology Sustainability Plan is centrally-funded and managed through the Information Technology Department. Funding for core system purchases is annualized, with a portion of noncapital equipment (e.g., computers, projectors) replaced each year. One-time funds have been used to initiate equipment replacement plans, and in some circumstances, these non-base building funds were provided for consecutive years before being built into the base annual budget. The Technology Sustainability Plan is funded at $1.3 million, up from $1.1 million in FY12, allowing the University to maintain its current level of technology available to students and faculty across all Colorado Mesa University campuses.

Colorado Mesa University continually reviews and works to improve its Technology Sustainability Plan. Information Technology is in the process of reviewing its hardware inventories and revisiting equipment life cycles to reflect current technology refresh requirements.
2012 goal update: The 2012 goal for developing a Technology Sustainability Plan, which includes projected replacement costs, equipment life cycles, and replacement schedules, is continued with this 2016 goal.

**Goal 5D:** Recruit and retain well-qualified IT staff.

**Alignment:** Institutional Goal 1, (01C, 01E)

**Status:** Ongoing

**Accomplishments:**
The Information Technology Department has added three new positions since 2012: an Applications Programmer, an Applications Administrator, and an AV specialist/Crestron Programmer. A computer technician position was upgraded with additional responsibilities to a Computer Support Coordinator. The majority of time spent by the Computer Support Coordinator goes towards supporting student and instructors in and outside of the classroom. The Crestron Programmer position for FY 2016-17 to support the more than fifty technology-enhanced classrooms and learning spaces added with the Escalante Hall and Tomlinson Library projects.

Although staffing levels have increased, the Information Technology Department is still lean compared to other institutions of comparable size and programming. To further exacerbate the situation, a number of retirements have left the department less experienced, including one highly-skilled, specialized Oracle DBA position. Salaries and job assignments are continuously being evaluated in an effort to retain key personnel, as well as improve work moral. The recruitment of well-qualified individuals continues to be challenging because of salary levels and the limited number of qualified applicants.

With the retirement of the Oracle database administrator in August 2015, CMU contracted with Ellucian Application Managed Services (AMS) to provide Oracle and MS SQL Server DBA support plus software maintenance service for all licensed Ellucian software and the third party software platforms on which it runs. Finding qualified technical employees with knowledge of Ellucian software and database architecture has proven difficult in the past.

Information Technology performed an analysis of alternate methods of obtaining this service, including using contract DBA consultants with Banner/Oracle experience. Ellucian was found to have the most competitive and comprehensive support proposal. Utilizing Ellucian AMS has provided a much needed expanded breadth of support for the newer technologies that CMU has implemented over the past few years including Microsoft Dynamics CRM and Banner XE. It has also freed up programmers’ time by not having software upgrade tasks to perform. CMU will also maintain more current Ellucian software releases. The transition to
Ellucian AMS was performed September through November which included setting up monitoring services.

**2012 goal update:** The 2012 goal for retaining and recruiting well-qualified team members was retained with this 2016 goal.

**Goal 5E:** Enhance IT Help Desk support services.

**Alignment:** Institutional Goal 3, (O3C)

**Status:** Ongoing

**Accomplishments:**
Most students will interact with the Information Technology Department only through the IT Help Desk. For this reason, it is important that the Help Desk provides excellent customer service because the end user’s help desk experience formulates their opinion of the IT department within the institution. In addition, the number and type of Help Desk requests can provide invaluable insight to the effectiveness of campus computing systems and help proactively identify campus-wide problems.

Information Technology staff members are continually enhancing help desk services through improved customer service and increase efficiency. Customer satisfaction can be improved by increasing the availability of the Help Desk, improving the quality of support end users receive, and improving communication with end users. Help Desk efficiency can be improved by training help desk staff, providing additional self-service tools and self-help information, improving time management, and improving intradepartmental communication.

Information Technology has implemented several help desk initiatives to improve customer service over the last two years. A number of these help desk initiatives are a direct result of the reconfiguration of Tomlinson Library and the new information commons and its distributed computer lab configuration. On top of improving the functionality of the Help Desk space with its updated office configuration and a more prominent service counter, the following Help Desk protocols were implemented:

- a process to more uniformly distribute help desk work orders among technicians;
- uniforms for student workers to improve the visibility and professionalism of Help Desk Assistants working at the help desk and throughout the information commons;
- the use of an iPod Touch and text based messaging via Lync as a simple, inexpensive method of communicating with roaming Help Desk Assistants; and
- the deployment of an instant messaging application, Chime, for use by library patrons to contact the Help Desk.
In addition, online Help Desk information was updated and web links coordinated with other student service departments to eliminate duplicated pages on the website where the same information was being maintained, and step-by-step help guides were created for the top service request topics such as how to connect mobile devices to the campus wireless network. Likewise, internal Help Desk reference documentation was updated into a single source of information for computer support staff and student assistants by employing SharePoint and OneNote.

Further, professional development opportunities were provided through online training and all technicians and help desk positions are required to obtain Apple and HP hardware maintainer certifications. The duties for the Computer Support Coordinator (CSS) position were modified to make this position responsible for scheduling CSS resources to more effectively respond to customer service requests. The group is also discovering ways to use collaboration tools to improve internal and external communication. Finally, regularly scheduled computer support staff meetings have been convened for cross training and to improve communication between department areas. Overall, the increased internal communication and coordination helped the Help Desk be more informed when dealing with incoming service requests.

**Goal 5F:** Leverage cloud-based software and services where practical, economical, and provides appropriate levels of information security.

**Alignment:** Institutional Goal 3, (O3C)

**Status:** Ongoing

**Accomplishments:**

With the pervasiveness of cloud applications and services, the University must continue to address security controls and policies to leverage cloud-based services to remain competitive. Starting in 2013, a process for evaluating software-as-a-service (SaaS) contracts was developed to protect the institution’s confidential information and mitigate institutional risk. In most cases, contracting with cloud-based service providers to host applications requires that institutional data be maintained off campus and outside the control campus departments, exposing the university to a data breach. Although data security cannot be controlled exclusively through a contract, the university minimizes the amount of confidential information exposed and requires the service provider commit to a certain level of data security standards and controls as part of the contract review process.
Initiative 6: Advance campus technology in support of institutional initiatives and campus expansion projects.

**Goal 6A:** Continuously enhance instructional technology standards to provide innovative teaching and learning environments.

**Alignment:** Institutional Goal 1, (O1D)

**Status:** Ongoing

**Accomplishments:**
The University has made a substantial investment in classrooms, labs and instructional technology. The number of ‘smart’ classrooms has increased to 207 from 113 in 2007. The Academic Technology Advisory Council and Information Technology staff evaluated digital video presentation equipment and classroom practices and developed a true, full-digital classroom technology standard during Academic Year 2010-11. The current classroom instructional technology standard includes touch screen controls, widescreen format displays with high-definition (1080p) projectors, and high performance digital video matrix switchers for HDMI signals compliant with the High-bandwidth Digital Content Protection (HDCP) standards. This classroom technology standard was implemented for the first time in twenty-eight classrooms as part of the Houston Hall renovation and most recently installed in the Tomlinson Library Renovation Project.

The most recent advancement in classroom instructional technology was the adoption of a wireless presentation device first deployed with the Tomlinson Library Renovation Project and Maverick Innovation Center. The wireless presentation device is now become standard equipment for classrooms, allowing instructors and students to share content from their mobile devices. Also with the Tomlinson Library Renovation Project and Maverick Innovation Center was the revitalization of group rooms, or “huddle” spaces, on campus to support student and faculty collaboration.

**2012 goal update:** The 2012 goal for developing a classroom technology standard that will provide an innovative teaching and learning environment was met as it an essential initiative to the core mission of the University. A classroom technology standard has been established, and this 2016 goal was modified to reflect the University commitment to continue to advance instructional technologies across all its campuses.
Goal 6B: Evaluate unified communication and call center solutions.

Alignment: Institutional Goal 3, (O3C)

Status: In-progress

Accomplishments:
Colorado Mesa University’s current Private Branch Exchange (PBX) telephone system was installed in 1998 and is past its life expectancy. The University needs to evaluate Voice over Internet Protocol (VoIP) solutions as a replacement for its traditional PBX options for integrating voice communication with other computer-based communication technologies, or unified communication, and call center management options.

Over the past twelve months, Information Technology staff has been configuring a trial installation of Microsoft Lync as a potential campus unified communication solution. Lync is relatively new to the voice-over-Internet Protocol (VoIP) space, and its reliability, vendor support options, and required business telephone feature set needs to be fully vetted. If using Lync is acceptable to campus, the University may realize substantial savings when compared to the capital purchase of other IP-telephone systems.

To date, Information Technology has configured a Lync environment, but its use has been limited to instant messaging and web conferencing components. The next step for the trial is connecting the Lync server to the public telephone network to test performance and handling of inbound and outbound calling. In preparation for this step, a session border controller (SBC) has been purchased and configured for integrating Lync with the campus ISDN PRIs, PBX, and local area network.

In addition to Lync and SBC configuration, Information Technology has installed AVST unified messaging server and TeamQ to test call distribution groups and informal call center features to work with Lync. Further, reviews of various unified communication vendor solutions are in progress for comparison of features and costs. An analysis of network performance and infrastructure to support any VoIP solution still needs to be performed.

Goal 6C: Develop an Information Technology standards guide to improve communication with architects and design teams.

Alignment: Institutional Goal 3, (O3C)

Status: Initiating

Accomplishments:
As the University continues to expand its facilities it has become ever more apparent that the campus would benefit from further developing technology
standards to more efficiently communicate campus requirements with project architects and design teams. Information Technology has a structured cabling specification that was established more than a decade ago. Today with increasing demands on staff time to facilitate capital construction project, CMU would benefit from developing an IT standards and pre-construction planning guide. The proposed guide would consist of telecommunications and audiovisual standards for capital project design teams who are involved in telecommunications infrastructure and classroom/meeting room projects on CMU’s campuses, and it would be a starting point for communicating expectations for everything related to technology from vaults and outside entrance cables to roof penetrations and outdoor wireless antennas.

2012 goal update: The 2012 goal for documenting IT utility infrastructure as part of the IT utility master plan was introduced to develop telecommunication vault infrastructure and as built drawings for IT utility corridors following a series of major infrastructure upgrade projects that started in 2009. Information Technology personnel, working with Cyberlink Corporation, have since completed this project and documented telecommunication infrastructure, including the copper, coaxial and fiber optic cables and conduits and vaults on the University’s main campus. Specifications for communication vault standards were also developed during this time.